

**WHAT IS CLAIMED:**

1. A composite sheet material having an upper and a lower surface comprising  
  
an flexible, compliant matrix which is essentially non-conductive, and  
  
discrete electrically conductive elements within the matrix;  
  
wherein the electrically conductive elements in a region of the composite sheet material are arranged into columns, and the orientation of these columns are in an essentially organized, non-random pattern with a majority of these columns oriented at angles less than about 90° and greater than about 15° to the lower surface of the composite sheet material.
2. The composite sheet material in claim 1, wherein the composite sheet material has a tensile modulus @ 100 % elongation of less than about 5000 psi.
3. The composite sheet material in claim 1, wherein the flexible, compliant matrix is formed from a elastomer.
4. The composite sheet material in claim 1, wherein the electrically conductive elements are ferritic.
5. The composite sheet material in claim 1, wherein the electrically conductive elements are essentially spherical.
6. The composite sheet material in claim 1, wherein the majority of columns

are oriented at angles less than about 90° and greater than about 45°.

7. A method of producing a composite sheet material having an upper and lower surface comprising the steps of:

molding a flexible, compliant matrix material which is essentially non-conductive containing electrically conductive elements in a mold with a region with a defined curvature,

aligning the electrically conductive elements substantially into columns while still in the mold,

wherein the majority of electrically conductive elements in the sheet when flattened are aligned essentially into columns, the majority of columns in the region with the defined curvature being at angles less than about 90° and greater than about 15° to the lower surface of the composite sheet material when flattened.

8. The method in claim 7, wherein the flexible, compliant matrix material is a thermoset polymer.

9. The method in claim 7, wherein the flexible, compliant matrix material is a thermoplastic polymer.

10. The method in claim 7, wherein the flexible, compliant matrix is an elastomer.

11. The method in claim 7, where the composite sheet material has a tensile

modulus @ 100 % elongation of less than about 5000 psi

12. The method in claim 7, further comprising the additional steps of flattening the molded composite sheet material, and applying at least one contact layer to one of the surfaces.

13. The method in claim 7, wherein the electrically conductive elements are aligned with a magnetic field.

14. A sensor for monitoring lateral or shear forces comprising:

at least two electrical pathways to and from the laminate material

wherein the laminate material comprises two layers of contact material which are substantially electrically conductive; and a composite sheet having an upper and lower surface material interposed between the two layers of the contact material; the composite sheet material comprising a flexible, compliant matrix which is essentially non-conductive, and electrically conductive elements, wherein the electrical properties of the composite sheet material changes measurably with respect to the amount of lateral and shear forces applied to the material.

15. The sensor in claim 14, wherein the two layers of contact material comprise an upper and a lower layer, and the upper layer is formed from multiple conductive lines.

16. The sensor in claim 14, wherein the two layers of contact material comprise an upper and a lower layer, and the upper layer is formed from two conductive triangular patterns.

17. The sensor in claim 14, wherein the two layers of contact material comprise an upper and a lower layer, and the upper layer is formed from two irregular, conductive triangular patterns.
18. The sensor in claim 14, wherein the electrically conductive elements in a region of the composite sheet material are arranged into columns, and the orientation of these columns are in an essentially organized, non-random pattern with a majority of these columns oriented at angles less than about 90° and greater than about 15° to the lower surface of the composite sheet material.
19. The sensor in claim 18, wherein the flexible, compliant matrix is an elastomer.
20. The sensor in claim 19, wherein the electrically conductive elements are essentially spherical.